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## DISCOVERIES AND IMPROVEMENTS IN ARTS, MANU- FACTURES, &c.

*Patent of Mr. John Davenport, of Lang-  
port, Staffordshire, Glass-maker, for  
a method of ornamenting all kinds  
of Glass, in imitation of engraving  
or etching.*

*Dated July, 1806.*

**T**HE invention, for which this patent  
is taken, is applied besides the  
purposes mentioned in the title, to  
form a rough surface on glass de-  
signed for window blinds in a cheaper  
and better manner than by grinding ;  
this being the simplest application of  
it, is preferred to begin the descrip-  
tion of the process.

The principle of the invention con-  
sists in the application of a coat  
of powdered glass to the surface of  
common glass, mixed with ingredients  
that enable it to adhere, and increase  
its fusibility, so that a heat below  
that required for melting the articles  
to which it is applied, will sufficiently  
soften it so as to make it unite firm-  
ly to them, without losing the rough-  
ness of its surface.

The process by which this coating  
is made to produce various figures,  
consists in tracing on it by graving  
tools, and other instruments, such  
devices as are desired, before the heat  
is applied, and while it only adheres  
by the tenacity of some of the in-  
gredients mixed with it. "By this  
means, borders, cyphers, coats of arms,

drawings, and the most elaborate de-  
signs, may be executed in a stile of  
elegance, equal, if not superior to  
any hitherto known," and at a much  
cheaper rate, than by the tedious and  
hazardous operations of the Glass-  
cutter's wheels.

The mixture of the coating, which  
Mr. Davenport recommends, is to  
consist of equal parts of the three  
following compositions prepared as will  
be directed.

No. 1, is composed of 160 parts  
of broken flint glass (called by glass  
blowers cullitt) 10 parts of pearl-ashes,  
40 parts of red lead, and 10 parts of  
Arsenic.

No. 2, consists of 120 parts of  
cullitt, or broken glass, 160 parts of  
red lead, 60 parts of sand, or sillex,  
and 60 parts borax.

No. 3, is formed by 70 parts of  
red lead,  $22\frac{1}{2}$  parts of sand, or sillex,  
and 40 parts of calcined borax.

Each of these compositions are to  
be fused separately. And then equal  
parts of them are to be taken and  
ground into an impalpable powder,  
and to be mixed with materials proper  
for coating the glass, to be afterwards  
mentioned.

Litharge may be used instead of red  
lead, and other proportions of the a-  
bove ingredients, or others of a like  
quality may be used ; or they may

be compounded in one mixture, instead of three; but Mr. Davenport produced the most beautiful specimens by the mode described.

This glass may be levigated in any of the usual modes, provided no injurious substance is introduced among it, and that it is reduced to the utmost degree of fineness; but for this purpose the patentee prefers using a small mill, with a pan, the bottom and sides of which are strong glass, with a grinder, or levigator, cast also of solid glass, to work in it.

When the glass is sufficiently levigated, it is to be mixed up with a composition, in order to apply it to the articles to be coated, consisting of one part of double refined sugar, dissolved in two parts of pure water; to which is added, at the time of putting in the powder, about one third part of common writing ink, or of a watery solution of calcined copperas.

The effect of adding the latter substances, the patentee supposes to be similar to that produced by the oxide of manganese, used in a small quantity by the glass-makers in making their best flint glass; because without this addition he has found, that the specimens had more of a cloudy or milky appearance (similar to that called by the workmen in the glass house *shappy metal*) and which quality it is understood, the manganese tends to destroy.

The use of the sugar is to make the coating adhere to the articles, in which it is superior to gum, from affording more facility to the operation of etching, or engraving, in the first instance; and the increase of this facility which may be procured by merely breathing on the part operated on, which makes it soft and pliable to the tool; while the parts not breathed on remain fast as before.

Enough of the fluid composition is to be added to the levigated glass, to render it of a proper consistence for laying on with a very thin and even surface. As the coating mixture becomes dry in working, it is to be moistened occasionally, with solution of sugar.

The coating is to be laid on with a brush of camel's or squirrel's hair,

BELFAST MAG. NO. XVIII.

the most convenient form for which it is to have its points spread out so as to form a segment of a circle.

After the coating is applied, any design intended is to be formed on it, by engraving, or working out from its surface by pointed instruments; such parts as are necessary to produce the proposed effect.

The glass, when thus engraved, and the plates coated plain, intended for window blinds, are to be exposed to a heat sufficient to produce a semi-vitrification of the coated surface, and to incorporate it sufficiently with the substance of the glass articles so coated. But great care must be taken not to extend the degree of heat farther than is necessary for these purposes, because in that case a complete vitrification of the coating would ensue, whereby the desired effect, of having a surface in imitation of the rough surface produced by grinding, would not be obtained.

This invention is not only applicable to all kinds of useful and ornamental articles of glass-ware whereon the common methods of glass-cutting and engraving have been practised but may be applied to window and plate glass, both in place of grinding, to make window blinds, and also to produce various devices on windows for altar pieces, libraries, museums, coach windows, and all other purposes, wherein plate glass and window glass have been commonly used.

This has also the advantage over the common method, of wearing much cleaner; for the surface of ground glass being somewhat fractured by the action of the wheel, is liable to gather dirt on the rough unpolished parts of the borders, or designs executed in the common manner.

*Remarks.*...This invention has much ingenuity and novelty to recommend it, and seems capable both of great improvement for the purposes mentioned, and of farther extension to others: particularly to make engravings for impressing designs on paper in the place of copper plate. It is possible also that copper or other metallic plates might be coated and

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engraved in a similar manner for forming designs for the press. These plates would be more durable than glass for this use; and the design would be formed on the coating with much more facility, than by cutting or engraving the metal itself, in the usual manner. When glass plates were used for this purpose they might be strengthened by cementing metallic plates beneath them.

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*Patent of Mr. John Bradbury of Navan, County Meath, cotton spinner, for a method of spinning cotton, flax, and wool.*

*Dated Dec. 1807.*

Mr. Bradbury's invention relates solely to some alterations in the spindle and fly, from which he asserts considerable advantages will arise.

The fly is placed in a reversed position on the spindle with its extremities upwards, and is fastened to a wharve, or pulley, which traverses on the spindle, and receives its motion from a drum separate from, and larger than that, which turns the spindle, the bobbin is sustained by the upper part of the spindle, which is turned smaller than the rest, so as to form a shoulder by which the bobbin is supported,

The traversing motion is effected by the rising and falling of the rail supporting the fly, or of that supporting the spindle.

The draught, or winding up of the thread, arises from the friction of the inside of the bobbin, against the small part of the spindle, and of its bottom against the shoulder of the spindle. This draught is regulated by increasing or diminishing the size of the wharve, or of the drum, which turns the spindle, by which the spindle moves slower or quicker than the fly, or remains stationary, as the quality of the thread requires. The spindle is placed in a vertical position, as being preferable to an horizontal, or oblique one.

The following advantages are stated by Mr. Bradbury, to arise from this arrangement. First, the fly, which moves distinct from the spindle, is the only part kept in rapid motion, in this method, by which there is a

saving of the force consumed in giving the same rapid motion to the spindles in the common method.

Secondly, from the same circumstance of the fly moving distinct from the spindle, the draught of the thread to the bobbin can be regulated to the utmost exactness. And, when once regulated, will remain invariably the same at whatever speed the machine shall turn; whereas in the old mode a variation of speed produces a variation of draught, which breaks the thread, and causes much waste.

Thirdly, on account of the inverted position of the fly, the bobbin can be taken off and put on with expedition; whilst in the old plan it was necessary to stop the spindle, and unscrew the fly from the top, or to take out the spindle. By these improvements the quantity of yarn produced by each spindle is nearly double to that, by the old plan, of any degree of fineness required with the same power.

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*Remarks...*The quantity of motion saved, for a single spindle in this method may seem inconsiderable, yet in a large factory it would amount to a considerable sum, and enable the first mover to perform more work in a proportional quantity. Thus a steam engine, or a water wheel, capable of working two thousand spindles in the common plan, might in Mr. Bradbury's work 2,250 or more. The facility of taking off the bobbin has an advantage, not mentioned by Mr. Bradbury, in saving wear and tear of the machinery which must more or less occur in the old method in unscrewing and screwing on again the flies, as frequently as is required in shifting the bobbins.

The modes of regulating the proportional speed of the fly to that of the bobbin to so great a nicety, must also be of considerable importance, particularly for fine work, in which waste is more injurious.

We are informed by a skilful cotton manufacturer, that he has seen this arrangement of the fly and spindle, several years before the date of this patent.